

# RELATIONSHIPS BETWEEN AIR POLLUTION AND ROAD TRAFFIC NOISE

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**Background and Aims:** One of the objectives of Escape is to assess the health effects of road traffic related air pollution with adjustment of road traffic noise. For four areas in Escape the correlation between traffic-related noise and NO<sub>2</sub> was studied.

**Methods:** In the Netherlands noise levels and air pollution concentrations were predicted for the whole population using the EMPARA-model. In Girona (Spain), a CADNA-A-based noise model and measured annual mean NO<sub>2</sub> concentrations at 83 addresses were used. For two Danish cities the noise model SoundPLAN and the AirGIS dispersion model for NO<sub>x</sub> were applied. In the Ruhr area a categorical noise map and land use regression models were used. Noise and air pollution values were assigned to home addresses and the correlation was evaluated.

**Results:** The noise exposure in the Netherlands has an arithmetic mean of 52 dB (IQR=9), in Girona 63 dB (IQR=8 dB) and in Denmark 58 dB (IQR=10 dB). The majority of the population in the Ruhr Area had the reference value (below 55 dB). The mean NO<sub>2</sub> concentration in the Netherlands was 24.8 µg/m<sup>3</sup> (IQR=7.8 µg/m<sup>3</sup>), in Girona 26.9 µg/m<sup>3</sup> (IQR=12.2 µg/m<sup>3</sup>), in Denmark (mean NO<sub>x</sub>) 30.2 µg/m<sup>3</sup> (IQR=10.2 µg/m<sup>3</sup>), and in the Ruhr area 30.2 µg/m<sup>3</sup> (IQR=6.2 µg/m<sup>3</sup>). In the Netherlands and the Ruhr area the correlation between the NO<sub>2</sub> concentrations and road traffic noise is fair (0.38/0.34). In more urban study areas, like Girona and Copenhagen, correlations were substantial (0.62 and 0.79). In the Netherlands, in rural study areas in the vicinity of motor ways, the correlation was moderate (0.53).

**Conclusions:** The correlation between traffic-related noise and NO<sub>2</sub> for mixed study areas is in general fair. However, the correlation is area-specific, thus in urban areas or in the vicinity of motor ways stronger correlations can occur and confounding can not be excluded.